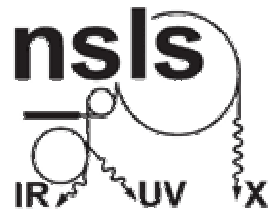


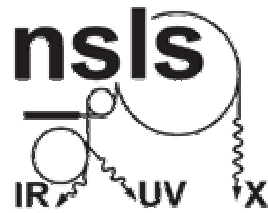
# NSLS Winter Wonderland !



**Brookhaven National Laboratory**

**Operated by Brookhaven Science Associates for the U.S. Department of Energy**

# OED 'Safety Partnership'



What you've taught  
me about Safety  
(so far .....)



16 December 2004

Erik D. Johnson

Associate Chair for Operations and Engineering

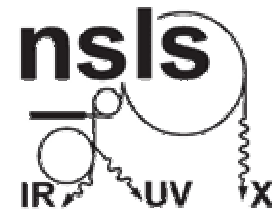
Brookhaven National Laboratory

**BROOKHAVEN**  
NATIONAL LABORATORY

Operated by Brookhaven Science Associates for the U.S. Department of Energy

# Guiding Principles

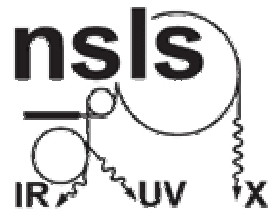
---



- ✦ **People use their heads.....**
- ✦ If something doesn't look right stop and sort it out
- ✦ Be on guard for things that you've been used to for years. A fresh look may provide a different perspective.
- ✦ Primary goal: Be safe in your life, at work, at home everywhere....

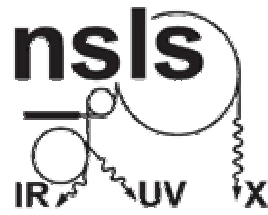
# Outline

---



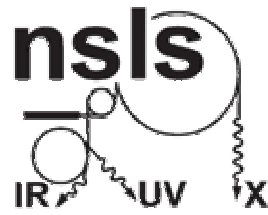
- ✧ OED Safety Concerns
- ✧ Toolbox Meetings (Spring 2004)
- ✧ Shock Incident
  - ✧ Causal Factors
  - ✧ Lessons Learned
  - ✧ Corrective Actions
- ✧ Next Steps and Discussion

# OED Safety Issues



- ✦ OED concerns are largely those raised in Spring 2004 Toolbox meetings (see following slides)
- ✦ Many of the issues raised in Toolbox meetings echo causal factors in recent incidents
- ✦ For OED 'Safety Partnership Week' should be a point of departure for extension of the OED Toolbox series

# OED Toolbox Safety Meetings



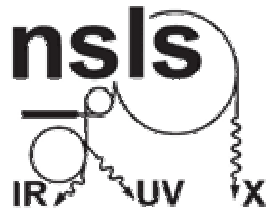
## Response to Department Commitment:

- ✦ Review lessons learned from critiques with staff
  - ✦ Experiment operated w/o safety approval
  - ✦ Beamline alignment w/o required safeguards
- ✦ Completion by June 1<sup>st</sup> required

## Method used by OED:

- ✦ Toolbox meetings with Associate Chair
  - ✦ 11 Meetings between May 11<sup>th</sup> and 25<sup>th</sup>
  - ✦ Ranged in size from 1 to 10 people
  - ✦ 2 meetings attended by Mo Ali
- ✦ Two-way dialog on other safety concerns
- ✦ Follow-up opportunities identified

# OED Toolbox Safety Meetings II

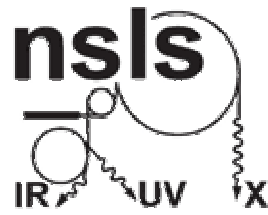


## Common Threads:

- ✧ See our workplace through fresh eyes
  - ✧ Old installations and practices not up to current standard
  - ✧ Habituation to environment may lead to missing something
  - ✧ Guard against knowledge loss
- ✧ Clear the Fog
  - ✧ Swamped by many kinds of safety inputs
  - ✧ Strident sometimes conflicting messages on expectations (Monday memos, 'Safety Alert', ....)
  - ✧ Workplanning and work control
    - ✧ Emphasis on procedure compliance
    - ✧ Very conservative controls
    - ✧ Inadequate support for implementation of 'extraordinary' controls



# OED Toolbox Safety Meetings II



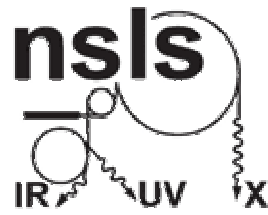
## Follow-up:

- ✧ Discuss Feedback as appropriate
  - ✧ Follow-up Meetings
    - ✧ Mo Ali, Praveen Chaudhari, Bill Hempfling, Jim Tarpinian
  - ✧ Discuss at organization meetings
    - ✧ PPG, NSLS Operations Council, OED management
- ✧ Activities
  - ✧ OED assessment of equipment
  - ✧ Workplanning
    - ✧ Internal Audit augmented by WRC/EDJ this year
  - ✧ Report progress to OED staff



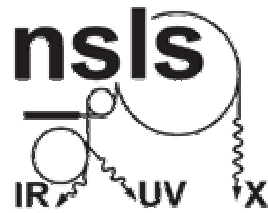
# X1 Photon Monitor Shock

---



- ✧ Six Causal Factors
- ✧ Lessons Learned
  - ✧ Management
  - ✧ Supervisors
  - ✧ Workers
  - ✧ Staff and Users

# Causal Factor 1:



*Tech assumes system in safe configuration to begin work*

Apparent Cause #1

- ✦ There was no procedure that the LC or utilities group could refer to place the PBPM in a safe configuration prior to replacing the hose.

Apparent Cause #2

- ✦ The communication between the tech and the LC was incomplete.

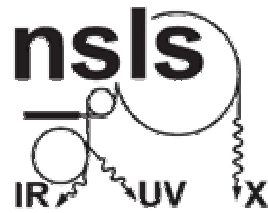
Apparent Cause #3

- ✦ The instruction and briefing provided by the supervisor to the tech performing the work needed improvement.

Apparent Cause #4

- ✦ The use of Lockout/Tagout needed improvement.

# Causal Factor 2:



*The X1A1/A2 LC was not aware that the PBPM was biased at 300 VDC nor aware of location of power supply in the electronic rack at front end of the X1 beamline.*

Apparent Cause #5 (same as #1)

- ✦ There was no procedure that the LC or utilities group could refer to place the PBPM in a safe configuration prior to replacing the hose.

Apparent Cause #6

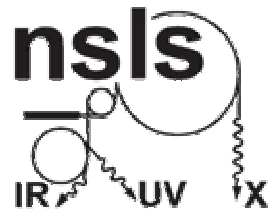
- ✦ The instruction and training provided to the Local Contact needs improvement.

Apparent Cause #7

- ✦ The Local Contact was not qualified to assume responsibility for placing the PBPM in a safe state.

# Causal Factor 3:

---



*Caution sign found laying face down near box.*

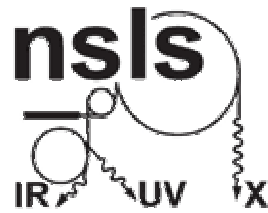
## Apparent Cause #8

- ✦ The manner in which the warning sign was affixed did not adequately consider the radiation environment of the X-ray ring.

## Apparent Cause #9

- ✦ The placement of the original warning sign was inadequate.

# Causal Factor 4:

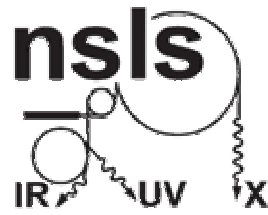


*The requirement implemented previously to lock and tag out the power supply to the PBPM was not documented and resulted in a loss of historical information.*

## Apparent Cause #10

- ✦ The communication and documentation system for ensuring that established safety requirements associated with maintenance are documented and carried forward needs improvement.

# Causal Factor 5:

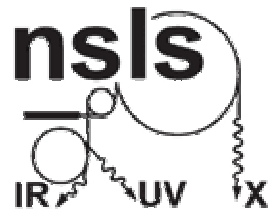


*Based on NSLS specific training LC believed BNC cables used for <50V.*

Apparent Cause #11

✦ The "Sci/Tech Staff Safety Training Module" needs improvement.

# Causal Factor 6:



*Equipment responsibility not adequately assigned for  
Photon Beam Position Monitor*

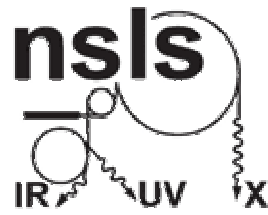
Apparent Cause #12

- ✦ The assignment of responsibility for the X1 PBPM was inadequate.



# Lessons Learned:

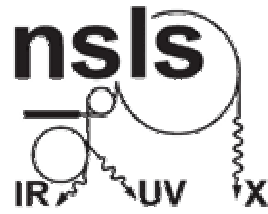
---



## *Management:*

- ✦ Ensure that all beamline and facility equipment with significant hazards has clear ownership and a responsible person.
- ✦ It is vital that all hazardous equipment has someone designated to maintain safe configuration, including appropriate warning signs, and to act as a contact for questions concerning hazards, operation, maintenance, and troubleshooting.

# Lessons Learned:

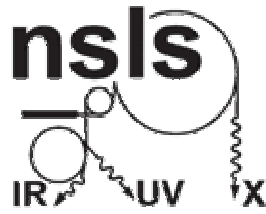


## *Supervisors:*

- ✧ Do not assign work as "skill of the worker" on equipment with electrical or other energy sources that you are unfamiliar with. "Skill of the worker" should be restricted to tasks for which the worker has been formally qualified by the supervisor, and it is known that the work is low hazard. Work permits should be expected for work with unfamiliar equipment that is potentially hazardous unless a designated responsible person has confirmed the equipment is in a safe state and has placed the first lock-out when required.
- ✧ When screening work to determine hazard level and work planning requirements, be particularly cautious with equipment that has no readily identifiable responsible person. "Legacy" equipment with unclear ownership may have hazards that have been long forgotten and work should not proceed on these systems until their function, hazards and operation are defined.

# Lessons Learned:

---



## *Workers:*

- ✦ All electrical equipment must be de-energized before work may begin on the system. You must assure that the power supply is de-energized, locked, and tagged out and in a confirmed safe state before work begins.
- ✦ Make no assumptions. If there is uncertainty, contact your supervisor and ask to initiate a formal work plan.

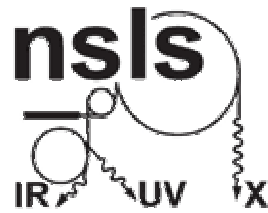
# Lessons Learned:

---

## *Staff and Users:*

- ✦ Do not alter the configuration of equipment or components unless you are authorized to make changes and are knowledgeable of the hazards associated with the equipment.
- ✦ Use inherently safe voltages ( $< 50$  V a.c./d.c. or  $< 10$  mA) whenever possible when designing and constructing equipment.

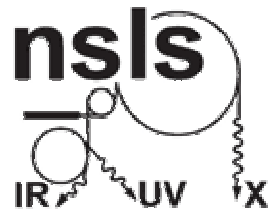
# OED: What you Already Knew...



## Common Threads:

- ✧ See our workplace through fresh eyes
  - ✧ Old installations and practices not up to current standard
  - ✧ Habituation to environment may lead to missing something
  - ✧ Guard against knowledge loss
- ✧ Clear the Fog
  - ✧ Swamped by many kinds of safety inputs
  - ✧ Strident sometimes conflicting messages on expectations (Monday memos, 'Safety Alert', ....)
  - ✧ Workplanning and work control
    - ✧ Emphasis on procedure compliance
    - ✧ Very conservative controls
    - ✧ Inadequate support for implementation of 'extraordinary' controls

# Corrective Action Plan:



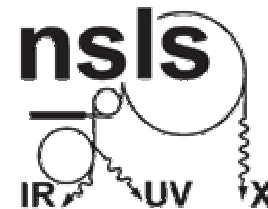
*What things are required and what we are doing*

- 7 ✦ Share lessons learned with NSLS community
- 6 ✦ Identify hazardous equipment
- 3 ✦ Develop means for retaining and sharing knowledge regarding equipment
- 4 ✦ Make sure people have the information and training they need to do their work safely (Qualification Matrix, JTA, R2A2), Assessments

20 Items in the ORPS system that are corrective Actions

Look at CAP Outline

# OED: Things We Can Do



## Participate in Corrective Actions

- ✦ Section heads already working with staff on OED items
- ✦ Input to how the corrective actions are accomplished

## Proactive Identification of things we can improve

- ✦ Readers-Digest version of Work Planning Subject Area
- ✦ Back-up Process for Work Control Coordinators
- ✦ Work submission checklist
- ✦ Coordination for Enhanced MARTI
  - ✦ Hazardous Equipment Lists
  - ✦ Information signage
  - ✦ Equipment responsibility lists
- ✦ Coordination of R2A2's with JTA and Job Qualification Matrix

## Revisit Toolbox Meeting Process

**We need to actively clear some of the fog ourselves....**



# 50.

**WE OWN THIS PLACE!**

*This is our joint.*

*It is our life.*

*We are in charge.*

*Excellence is in our hands. . .*

*to choose. . . or loose.*

**tom**peters!

REINVENTING WORK the personal service firm 50